Cliff and inventing a method for drawing the meridian line by the Pole star and finding the hour by the same; in 1703, on June 15, 16, and 18, he was making some observations on spots on the sun; and in 1706, on May 12, in conjunction with Flamstead at Greenwich, Captain Stannyan at Berne, and Mr. Sharp at Bradford, he was taking observations of the great solar eclipse of that day.

From his various reports on these subjects it is clear that Mr. Gray, while at Canterbury, had a good observatory; he had three telescopes, one of which was of 16 ft., an astronomical table, a theodolite, a pendulum clock, and various other instruments, with the use of which he was quite familiar; but what his occupation was, otherwise, there is no record.

We now lose all sight of Gray until 1717, when we find him being recommended to the Charterhouse by Prince George to become a pensioner there. The letter of recommendation is signed by the Prince, but says no more than that the applicant is a proper person to receive the advantage of residence. In 1719 he entered the building as a pensioner and remained there until his death, seventeen years later.

With his entrance into the Charterhouse a new career of scientific research seemed to have opened itself to Mr. Gray. He became an electrician, and, said Dr. Richardson, his experiments led to such extraordinary results that, but for them, electrical science might have waited for centuries, or for ever, in the state in which he found it. That the audience might know upon what pre-existing data Gray proceeded, Dr. Richardson traced back the origin of experimental electricity to the reign of Queen Elizabeth and to her physician, William Gilbert. He reviewed from this source, briefly and succinctly, the labours of Boyle, Otto de Guericke, Wall, Newton, and Hawksbee, introducing a model of Hawksbee's revolving cylinder, and Sir Isaac's simple experiment of making light bodies move between an excited plate of glass and a table.

In 1720 the first electrical work of Mr. Gray saw the light in a paper entitled "An account of some new electrical experiments," which appeared in that year in the Philosophical Transactions. In this paper the communicability from one electrified substance to other substances not previously electrified is described.

From this point in Mr. Gray's career Dr. Richardson traced him step by step through his experimental researches, making each of his (Gray's) experiments a matter of direct demonstration to the audience, and using only the simple kind of instruments the original investigator himself had at command. Thus were demonstrated the experiments of the cork and the excited tube, the ivory ball on the wooden rod, and the pack-thread experiments, by which Gray discovered that electricity could be conducted long distances. Next were demonstrate the famous loop experiments and those with bridges of pack-thread, silk, and wire, by which silk was discovered to be an insulator, and the new fact of insulation was recorded. The audience, at this point, were carried, by description, to the Mansion of Mr. Granville Wheeler, Otterden House, near Faversham, and were shown by a beautifully simple diagram, drawn for the occasion by the distinguished George Cruikshank—how Mr. Gray, putting up poles in Mr. Wheeler's grounds, insulated a pack-thread line on silk supports, and on July 14, 1729, sent by the line a communication through a distance of 650 ft.

Another series of experiments showed how Mr. Gray discovered induction, the conducting power of water and of metals; the fact that electricity arranges itself upon the surfaces of bodies; that attraction will take place *in vacuo*; and that an insulated, pointed iron rod, when electrified by induction, will yield a brush at its extreme point, will charge another insulated conductor, will give a spark to the knuckle when tha is brought near, and will pass through a chain of animal bodies, if they be insulated.

A beautiful experiment with a soap-bubble, showing how, when insulated and charged, it will attract, closed the experimental part of the lecture. The experiments throughout were highly successful, and were so rendered as to be distinctly visible to all the observers.

A few more points in the personal history of Gray were introduced. It was told that he gained the first Copley Medal of the Royal Society in 1731, and the second in 1732, and that he was admitted a Fellow of the Society on March 15 of the latter year. A graphic description was given of a meeting of the Royal Society on November 25, 1731. At this meeting Prince George was present with the Duke of Lorraine, and the Duke was admitted a Fellow. Afterwards a model of a fire-engine, used at York, was exhibited; then Dr. Frobenius lectured on phlogiston, and on the transmutation of phosphorus, using several pounds' worth of that now common element. Finally, the company ascended to the library, where Mr. Gray showed some experiments, proving how electricity travels along conductors, and succeeded well, notwithstanding the largeness of the company.

Two remaining subjects relating to Gray were briefly touched upon. One was his prediction that what he was doing *in minimis* would some day be so extended, that electrical phenomena would be made to resemble those of thunder and lightning; and the other, his belief that he had invented what he called a Planetarium, that is, a method of making a pith-ball suspended by silk move in circles or ellipses round a metallic centre set in a cake of resin, while the resin was excited by friction of the hand. The first of these observations of Gray had been fulfilled; the latter had appeared as an error of the last days of this wonderful man, and might well be forgiven.

The death of Stephen Gray afforded the lecturer an opportunity for a touching description of a man of science struggling to the last with his labours. On February 14, 1735-36, he was visited by Dr. Cromwell Mortimer, the secretary of the Royal Society, who took from his lips the account of the Planetarium by which, "if God spared his life," the electrical philosopher would create, he thought, much astonishment: but the following day, experiment, speculation, and hope, lay alike low in death.

NOTES

The report which reached England a few days ago of the death of Livingstone, and which Dr. Kirk was able to characterise as possibly unfounded, as it closely resembled a discredited one current in Zanzibar before he left, received important confirmation yesterday morning. We are enabled, however, to state that a letter seems to have come from Lieut. Cameron at Unyanyembe, reporting that a man named Chumas, who was with Livingstone, had arrived there with a circumstantial story of his death, which Lieut. Cameron, with his slight knowledge of Suabili, had to turn into English. It now depends upon the veracity of Chumas, of which at present there is no means of judging. The circumstantiality is nothing, for the tale of the lying Johanna man was quite as detailed. There is, however, we are bound to confess, much reason to fear that we have lost one of the most unselfish, noble, and devoted investigators the century has produced.

The Council of the Geological Society has awarded the Wollaston Medal for the present year to Prof. Oswald Heer of Zurich, and the balance of the Proceeds of the Wollaston Donation Fund to M. Henri Ngst of Brussels. The Murchison Geological Medal was awarded by the Council to Dr. Bigsby, F.G.S., and the balance of the Proceeds of the Murchison

Geological Fund to Mr. Alfred Bell and Mr. Ralph Tate, F.G.S., between whom it will be divided.

WE are glad to note that the Emperor of Brazil has conferred upon Dr. Huggins, F.R.S., the honourable distinction of Commander of the Order of the Rose.

WE are informed there is a scheme in contemplation for the erection of an aquarium at Margate. The building will commence at Cold Harbour and pass round Fort Point to the flagstaff point on the Fort Promenade, and will be carried out by a limited liability company, with a capital of 15,000*l*. In all likelihood the work will be commenced early in the spring and will take about nine months to complete. According to present plans the aquarium will be 250 ft. long by 100 ft. broad, and will be connected with a large hall suitable for concerts and balls.

THE Royal Irish Academy have granted to Messrs. Draper and Moss the sum of 30*l*. towards their researches on Selenium, and 35*l*. to G. J. Stoney, F.R.S., towards the construction of the Academy's spectroscope.

ON the 19th inst. Prof. Corfield delivered a lecture on Smallpox and Vaccination, in connection with the Laws of Health Class of the Birmingham and Midland Institute.

A COURSE of "Science Lectures for the People" has been arranged by the Council of the Crewe Mechanics' Institution, to be delivered in their hall. The following is the programme for the next two months:—February 5th and 12th, two lectures on "Mechanics," by Sedley Taylor, M.A., late Fellow of Trinity College, Cambridge; February 19th and 26th, two lectures on "Waves," by G. W. Hicks, B.A., scholar of St. John's College, Cambridge; March 5th and 12th, two lectures on "Light," by William Garnett, B.A., scholar of St. John's College, Cambridge. These two last will treat of spectrum analysis, and its application to the Bessemer flame. H. N. Read, B.A., of St. John's College, Cambridge, will give the two concluding lectures on "Chemistry," on March 19th and 26th. Each lecture will be illustrated by experiments.

WE have received two more of the penny reprints of the Science Lectures for the people delivered at Manchester, namely:—"Muscle and Nerve," by Prof. Gamgee, M.D., F.R.S., and "The Time that has elapsed since the Era of the Cave Men of Devonshire," by William Pengelly, F.R.S. They both seem admirably adapted for the purpose for which they were given, the subjects being treated clearly and familiarly without that sacrifice of scientific accuracy which is often the bane of popular lectures delivered before mixed audiences.

WE have received the thirteenth annual report of the Manchester Scientific Students' Association, containing an account of the various soirées, excursions, and papers for the past year. We are pleased to see that the Committee speak very favourably of the position and prospects of the Society. The total number of members is 177. During 1873 two soirées were held, seventeen lectures delivered on various branches of science, and eleven excursions made to places of scientific and antiquarian interest in the locality.

A NEW society has been formed at Londonderry under the name of the "Londonderry Scientific Association" to promote the study of physical, natural, and historical science. Courses of lectures will be delivered on scientific subjects, single lectures on special subjects by eminent Lecturers will also be provided as occasion may serve, and excursions made during the summer for the field-study of Geology, Zoology, and Botany. The first meeting was held on January 14, when Mr. W. E. Hart, M.A., President of the Society, occupied the chair and opened the proceedings by reading a paper on "Local Scientific Societies; their aims and objects;" in which he pointed out the importance of the study of natural science, both as in itself a valuable branch of education, and as a means of intellectual discipline. This was followed by a discussion on the "Relations of Physico-Geographical Conditions to Civilisation." The "Londonderry Scientific Society" is chiefly composed of ex-members of the "Londonderry Natural History and Philosophical Society," which ceased to exist some two years ago.

WE learn from Mr. Gerard Krefft, F.L.S., Curator of the Australian Museum at Sydney, that the museum, which is the oldest and richest in the Australian colonies, was visited last year by nearly 250,000 persons, who were admitted free. We understand that Mr. Krefft will be glad to receive specimens of all kinds from any individuals interested in the progress of science in New South Wales.

MR. HENRY SOLLY writes to the *Times* with reference to the address issued by the Trades Guild of Learning noticed in NATURE. He says that the Guild originated with himself, and was first proposed at a meeting he called last March to a number of leading working men, when Lord Lyttelton was in the chair, and when Mr. James Stuart, of Trinity College, Cambridge, the originator of the University Extension Scheme, was present at his invitation. A Provisional Committee was then formed, consisting of most of the working men present, with the addition of Mr. Stuart, Mr. Webster, Q.C., Mr. Hodgson Pratt, Mr. Edward Hall, himself, and a few other friends of the movement. That committee resigned its trust, after doing a good deal of work, to a conference held in June at the Hall of the Society of Arts, when the Guild was formally founded, and a Council was appointed on which nearly the whole of the Provisional Committee was placed.

DURING several days in December, says the *Levant Times*, consternation prevailed in the town of Adramytti, in Asia Minor, in consequence of certain ominous noises which seemed to proceed from a considerable depth below the earth's crust. The sound which was heard at intervals and resembled the report of distant cannon, was accompanied and followed by shocks of earthquake, which added to the terror of the inhabitants. At a short distance from the town and in the surrounding villages there was no such cause for alarm, the earth maintaining its normal condition of harmless repose. These details are, no doubt, trustworthy, as they are taken from the report sent in by the Governor of Adramytti to the Governor-General of the Vice-Royalty of Smyrna.

ON December 1, at 10.25 A.M., a violent shock of earthquake was felt at Sofia, in European Turkey. The shock was accompanied by a loud subterranean noise.

THERE were two shocks of earthquake at 8 P.M. on Dec. 26 at Salonika, in European Turkey.

AT the Berlin Medico-Psychological Society in November last, says the *Medical Times and Gazette*, Dr. Hitzig, the author of the method of examination of the brain by electricity, made some remarks on Dr. Ferrier's well-known experiments on the localised functions of the brain, especially with regard to the discrepancies between his own and the latter's results. He considers that the chief of these is that while he and Fritsch have found only one part of the convexity of the hemispheres capable of electrical excitation, Ferrier extends this property to nearly the whole of it. This Hitzig explains by saying that Ferrier has in his experiments used two strong currents (the secondary coil of Stohrer's battery being pushed into eight and even four centimetres), and has thus excited the ganglia at the base of the brain, so that it is to them, and not to centres localised in the cortex, that the movements noted must be referred. Another reason why Hitzig doubts some of the effects of irritation in Dr. Ferrier's cases is because, although there is such a remarkable similarity between the brains of the dog and the cat, the latter found that electrisation of the spot on the cat's brain corresponding to the centre of movement for the tail in the dog gave no result. Hitzig has repeated several of the experiments in which Ferrier's results differed from his own, and declares that his own views are re-confirmed. He will shortly publish a detailed account of all his work in Du Bois-Reymond's *Archiv*.

DR. PETERS of Berlin, in the 1873 *Festschrift* of the *Gesellschaft Naturforschen der Freunde zu Berlin*, has described a very interesting new genus of Rodent animals, named by him *Dinomys branickii*. The specimen on which the memoir is based is a skin and skeleton, which were placed in his hands by Mr. L. Taczanowski, Conservator of the Zoological Museum at Warsaw, the latter naturalist having obtained it from Mr. Constantin Jelski, who found it in the high lands of Peru.

WE are glad to know that a Microscopical Society has been founded in Victoria quite recently, this being the first of such institutions established in Australia. The first meeting, held at Melbourne, was under the presidency of Mr. W. H. Archer, the Registrar-General of the Colony, who gave an interesting introductory address, in which he showed the great field there is for fresh work in that comparatively unexplored country.

WE noticed in NATURE last week the announcement of a work by Sir Bartle Frere, G.C.B., G.C.S.I., called "The Impending Famine in Bengal; how it will be met, and how to prevent future Famines in India," with maps; to be shortly published by Mr. John Murray. Amongst Messrs. H. S. King and Co.'s forthcoming books we find the following:—"The Threatened Famine in Bengal; how it may be met, and the recurrence of Famines in India prevented," by Sir H. Bartle Frere, G.C.B., G.C.S.I., &c., with three maps. Is it not somewhat strange that two publishing firms should announce separate works by the same author, with titles that are so nearly synonymous?

MESSRS. H. S. KING & Co. will shortly publish—"Longevity: the Means of prolonging Life after Middle Age," by Dr. J. Gardner, author of "Household Medicine." "The Principles of Mental Physiology, with their applications to the training and discipline of the Mind, and the Study of its Morbid Conditions," by W. B. Carpenter, M.D., LL.D., F.R.S. "Physiology for Practical Use," by various eminent writers. Edited by James Hinton. 2 vols., with 50 illustrations. "The History of Creation:" a popular account of the development of the earth and its inhabitants, according to the theories of Kant, Laplace, Lamarck, and Darwin. With coloured plates and genealogical trees of the various groups of both plants and animals, by Prof. Ernst Haeckel of Jena. "The New Chemistry," by Prof. Josiah P. Cooke, of Harvard University, with numerous illustrations.

MESSRS. WM. BLACKWOOD AND SONS have in the press the following works relating to natural science:—An "Advanced Text-book of Botany for the Use of Students," by Robert Brown, F.R.G.S., Lecturer on Botany under the Science and Art Department of the Committee of the Privy Council on Education and author of the "Races of Mankind," just published by Messrs. Cassell, Petter, and Galpin; "Domestic Horticulture, Window Gardening and Floral Decorations," by F. W. Bu bidge; and "Economic Geology, or Geology in its Relation t the Arts and Manufactures," by David Page, F.G.S., Professor of Geology in the Durham University College of Physical Science, Newcastle.

MR. WILLIAM TOPLEY'S interesting paper, with maps and sections "On the Relation of the Parish Boundaries in the South-east of England to Great Physical Features, particularly to the Chalk Escarpment," has been reprinted in a separate form from the *Journal of the Anthropological Institute.*

IN *Le Tour du Monde*, is appearing a French translation of the account of the voyage of the German Arctic Expedition of 1869—70, in the ships *Germania* and *Hansa*. The illustrations are plentiful and beautiful.

WE have received the following reprints of papers by Mr. F. W. Putnam, from the *Bulletin of the Essex Institute* (U.S.):—"Description of a Stone Knife found at Kingston, N.H.," "Description of a Carved Stone representing a Cetacean, found at Seabrook, N.H.," and "Descriptions of Stone Knives found in Essex County, Massachusetts."

THE success of Professor G. W. Hough, of the Dudley Observatory, in constructing self-recording barometers and thermometers, lends additional interest to his announcement of the successful construction of an automatic evapometer and rain-gauge. The apparatus consists of a vessel two feet square and one foot deep, suspended on levers, and held in equilibrium by a small spring, the amount of change in the weight of the mass, either from rainfall or evaporation, being indicated on the scales of a delicate balance. In order to secure the mechanical record of the hourly variations in the weight of the vessel and of its contents, the professor causes the lever to vibrate between two platinum points so placed that whenever a change in the weight of the vessel by a given amount (say ten grains) takes place, a magnetic circuit will be established passing through an electro-magnet. A micrometer screw will then be operated by means of clock-work, thereby tracing a curve on a revolving drum, precisely as in the case of the self-recording barometer and thermometer.

THE principal articles in the last number of the *Canadian Journal of Science, Literature, and History* are—on "An Ancient Carved Stone, found at Chesterholm, Northumberland, England," by the Rev. Dr. M'Caul; an article by Dr. Daniel Wilson, on the work done by Alexander Gordon, the Scottish antiquary, author of the *Itinerarium Septentrionale*, and a paper, also published separately, by Prof. H. A. Nicholson, on "The Species of Favosites of the Devonian Rocks of Western Ontario." Appended are meteorological tables for Toronto for the half-year May to October 1873.

THE addition to the Zoological Society's Gardens, during the past week, include an Ocelot (*Felis pardalis*) from America, presented by Mr. J. Ryde; a White-headed Sea Eagle (*Haliaëtus leucocephalus*) from Nova Scotia, presented by Mr. H. Walpole; two Grey-breasted Parrakeets (*Bolborhynchus monachus*) from Monte Video, presented by Mrs. C. Dawkins; a Bernicle Goose (*Bernicla leucopsis*), European, presented by Mr. T. P. Tyndale; two Sclater's Curassows (*Crax sclateri*) from Maranham, and a Prince Albert's Curassow (*C. alberti*) from Columbia; a Capybara (*Hydrochœrus capybara*) from South America; a Rhea (*Rhea americana*) from Rosaria, and a Chimachima Milvago (*Milvago chimachima*) from Brazil, purchased or deposited, the last-named bird being new to the collection.